PATENT ABSTRACTS OF JAPAN

(11)Publication number : 10-305337
(43)Date of publication of application : 17.11.1998

(51)Int.Cl. B21D 43/10
H02K 41/025

(21)Application number : 09-115628
(22)Date of filing : 06.05.1997

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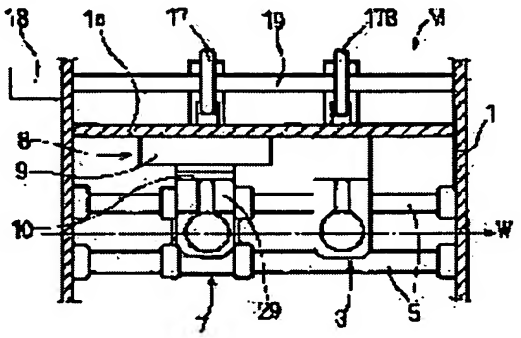
(54) FEEDING DEVICE FOR PRESS MACHINE

(57)Abstract:
PROBLEM TO BE SOLVED: To provide a feeding device for a press machine compactly constituted and easily arranged for a timing and manufactured at a low cost.
SOLUTION: The feeding device M is supported by a machine casing and constituted with a fixing clipper 3 having an upper jaw and a lower jaw and a moving clipper 7 which is guided by a guide axis 5 and moves to close and isolate against the fixing clipper 3. The moving clipper 7 has the upper jaw and the lower jaw which moves to close and isolate against the upper jaw and is equipped with a linear motor 8 attached to the machine casing. The linear motor 8 has a stationary part 9 with an electric magnet and a moving part 10 with a coil member and the stationary part 9 is attached to the inside wall 1a of the machine casing 1 and the moving part 10 is attached to a cylinder holder 29 of the moving clipper 7. When the coil member of linear motor 8 is energized, the moving part 10 is moved to the direction of work W feeding against the stationary part 9, whereby the moving clipper 7 holds the work W and carrys it to the press machine side.



LEGAL STATUS

[Date of request for examination] 25.12.2003
[Date of sending the examiner's decision of rejection]
[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]
[Date of final disposal for application]
[Patent number]
[Date of registration]
[Number of appeal against examiner's decision of rejection]
[Date of requesting appeal against examiner's decision of rejection]
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EFFECT OF THE INVENTION

[Effect of the Invention] Since it has the migration gripper which carries out approach isolation to a fixed gripper and said fixed gripper, and a work piece is grasped, it conveys to the press inside of a plane intermittently and both-way migration drives with a linear motor in the direction of said fixed gripper of said migration gripper which carries out approach isolation while the feed gear of a press machine is arranged at a press machine according to this invention, while the feed gear itself is simplified sharply and becoming compact, it is connected to sharp reduction of a manufacturing cost. Furthermore, while the actuation timing like each part to which a work piece is made to transport becomes very easy and can perform stable ****, the timing of each actuation can be set up freely and proper timing doubling as occasion demands becomes possible.
[0034] Moreover, if each Shimo jaw of a fixed gripper and a migration gripper is operated by the servo motor and the cam, since the configuration by the drive connection from a press machine is not needed, it can constitute in a compact further.

[Translation done.]

PRIOR ART

[Description of the Prior Art] Conventionally, it connected with the crankshaft of a press machine, and the gripper feed which conveys a work piece to a press machine was driven, and is equipped with the fixed gripper and migration gripper which have a fixed jaw (henceforth an upper jaw), and a movable jaw (henceforth a bottom jaw) as indicated by JP,7-24891,B. And a bottom jaw approaches a fixed jaw side and a migration gripper grasps a work piece, when it reciprocates by carrying out drive connection in mechanism and is moved to a press machine side. In this condition, since a fixed gripper is in the location which a bottom jaw isolates to an upper jaw, a work piece is conveyed by migration of a migration gripper at a press side. Moreover, when a migration gripper is moved to an anti-press machine side, it is moved in the direction which the bottom jaw of a migration gripper isolates to an upper jaw, it is moved in the direction in which the bottom jaw of a fixed gripper approaches an upper jaw, and a work piece is grasped. Therefore, a work piece will not be conveyed but a press machine will process a work piece in the meantime. And in order to make this movement into a high speed, various kinds of amelioration is made, and the gripper feed of highly precise and a high speed is offered actually.

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* NOTICES *

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TECHNICAL FIELD

[Field of the Invention] This invention relates to a migration gripper driving with a linear motor further about the feed gear of the press machine which has a migration gripper and a fixed gripper.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to a migration gripper driving with a linear motor further about the feed gear of the press machine which has a migration gripper and a fixed gripper.
[0002]
[Description of the Prior Art] Conventionally, it connected with the crankshaft of a press machine, and the gripper feed which conveys a work piece to a press machine was driven, and is equipped with the fixed gripper and migration gripper which have a fixed jaw (henceforth an upper jaw), and a movable jaw (henceforth a bottom jaw) as indicated by JP,7-24891,B. And a bottom jaw approaches a fixed jaw side and a migration gripper grasps a work piece, when it reciprocates by carrying out drive connection in mechanism and is moved to a press machine side. In this condition, since a fixed gripper is in the location which a bottom jaw isolates to an upper jaw, a work piece is conveyed by migration of a migration gripper at a press side. Moreover, when a migration gripper is moved to an anti-press machine side, it is moved in the direction which the bottom jaw of a migration gripper isolates to an upper jaw, it is moved in the direction in which the bottom jaw of a fixed gripper approaches an upper jaw, and a work piece is grasped. Therefore, a work piece will not be conveyed but a press machine will process a work piece in the meantime. And in order to make this movement into a high speed, various kinds of amelioration is made, and the gripper feed of highly precise and a high speed is offered actually.
[0003]
[Problem(s) to be Solved by the Invention] However, about the gripper feed which has the feed gear especially the conventional migration gripper, and conventional fixed gripper of a press machine, it is driving in mechanism through the connection mechanical component (for example, a timing belt, a delivery input shaft, a bevel gear, and migration gripper connection section) by which both-way migration of a migration gripper was connected with the crankshaft of a press machine. And when installing gripper feed in a press machine, it was carrying out by doubling the grasping timing of the delivery first location of a migration gripper, or a work piece with the timing of the crankshaft of a press machine, and adjusting a timing belt. Therefore, while the timing doubling took time amount, the configuration became complicated, it led to enlargement of equipment and the manufacturing cost of a machine was high.
[0004] This invention aims at offering the feed gear of the press machine which can moreover manufacture at cheap cost by compact and easy structure, and can also make delivery timing easy by solving an above-mentioned technical problem and omitting the drive from the crankshaft of a press machine as much as possible.
[0005]
[Means for Solving the Problem] In order to solve the above-mentioned technical problem, it constitutes from a feed gear of the press machine in connection with this invention as follows. That is, while being arranged at a press machine, it is the feed gear of the press machine for having the migration gripper which carries out approach isolation to a fixed gripper and said fixed gripper, grasping a work piece, and conveying to the press inside of a plane intermittently, and carries out that both-way migration drives with a linear motor in the direction of said fixed gripper of said migration gripper which carries out approach isolation as the description.
[0006] Moreover, it is characterized by equipping said linear motor with a stator including a coil object, and the migration child who is arranged movable to said stator and contains an electromagnet, constituting it preferably, fixing said stator to the machine stool of said feed gear, and fixing said migration child to said migration gripper.
[0007] Moreover, it may be characterized by equipping said linear motor with the stator which forms a magnetic circuit including an electromagnet, and the migration child who is arranged movable to said stator and includes a coil object, constituting it, fixing said stator to the machine stool of said feed gear, and fixing said migration child to said migration gripper.
[0008] Furthermore, if characterized by connecting with a cam means the movable jaw which grasps the work piece of said migration gripper and said fixed gripper, and said cam means driving with a servo motor, in addition, it is

desirable.
[0009]
[Embodiment of the Invention] Hereafter, the gestalt of 1 implementation of this invention is explained based on a drawing.
[0010] Feed gear (henceforth gripper feed) M of the press machine of this gestalt has the movable migration gripper 7 for the drawing 1 - two guide shafts 5 top supported by the fixed gripper 3 supported by the machine frame 1 and the machine frame 1 in the longitudinal direction, as shown in 2.
[0011] The migration gripper 7 is attached in the migration child 10 of the linear motor 8 supported by wall 1a of a machine frame 1. As it is arranged movable, showing around on the guide shaft 5 at the longitudinal direction in drawing so that approach isolation may be carried out to the fixed gripper 3 and shown in drawing 2 The bottom jaw 22 which carries out approach isolation to the upper jaw 21 and the upper jaw 21 is arranged, and it constitutes possible [grasping of the work piece W inserted in between the upper jaw 21 and the bottom jaw 22]. The configuration of this migration gripper 7 has not adopted what is known from the former (refer to JP,7-24891,B), and, of course, does not restrict it to this.
[0012] As the migration gripper 7 is shown in drawing 2 -3, it has the movable rail section 35 located under the bottom jaw supporter 30 located under the cylinder part 25 located above a work piece W, and the work piece W, and the bottom jaw supporter 30, and the supporter 40 which supports the migration gripper 7 possible [sliding], and a cylinder part 25 is attached in the cylinder holder 29, and the cylinder holder 29 is formed in one with the bottom jaw supporter 30 and the supporter 40.
[0013] a cylinder part 25 -- the inside of the cylinder room 26 and the cylinder room 26 -- the upper and lower sides -- it had the piston 27 arranged movable and the upper jaw 21 attached in the lower limit section of a piston 27, and the role for buffering the impact by approach migration of the bottom jaw 22 is played.
[0014] The bottom jaw supporter 30 is supported by the arm 32 supported to revolve by the pin 31 rockable and the arm 32, has the upper jaw 21, the bottom jaw 22 arranged in the location which counters, and the slipping child 33 stationed under the arm 32, and it is driven for the cam mentioned later, and it moves the bottom jaw 22 so that it may approach toward the upper jaw 21. Moreover, the coiled spring 34 which energizes an arm 32 caudad is arranged so that the bottom jaw 22 may be isolated from the upper jaw 21.
[0015] The movable rail section 35 has the rail holder 36 driven rockable for the cam mentioned later, and the roller object 37 with which it has been arranged on the rail holder 36, and two or more rolls have been arranged on the same flat surface, and it is constituted so that it may slide while moving an arm 32 up, and a child 33 can slide on a longitudinal direction.
[0016] A supporter 40 has the guide hole 42 in which two guide shafts 5 are inserted, and is formed in the shape of a binocular (refer to drawing 2), and both-way migration of it is carried out in the work-piece conveyance direction, the drive of a linear motor 8 showing around at the guide shaft 5.
[0017] The jaw mechanical component 45 which carries out vertical migration of the movable rail section 35 has a cam 17 and the swinging arm section 46, an end is connected to a servo motor (refer to drawing 1) 18, and the cam 17 is being fixed to the cam shaft 19 which rotates by the drive of a servo motor 18.
[0018] It has the swinging arm 48 rocked centering on a shaft 47 as the swinging arm section 46 is shown in drawing 2 and drawing 4 , and the cam follower 49 which it is contacted by the cam 17 and arranged at the end of a swinging arm 48, and the other end of a swinging arm 48 is formed in two arms so that the rail holder 36 may be inserted, and it is connected with the rail holder 36 rotatable through the pin 50, respectively. And a movable rail 36 is raised and the bottom jaw 22 is made to approach the upper jaw 21 through slipping child 33 and an arm 32, when the eccentric section of a cam 17 will press a cam follower 49 if a cam 17 rotates, and a swinging arm 48 rotates counterclockwise centering on a shaft 47 by the drive of a servo motor 18. Moreover, if the eccentric section of a cam 17 is passed, a swinging arm 48 will rotate clockwise, will drop the rail holder 36, will be slippery with coiled spring 34, and will isolate the bottom jaw 22 to the upper jaw 21 through child 33 and an arm 32.
[0019] On the other hand, as shown in drawing 1 -2, the migration child 10 of a linear motor 8 is attached behind the cylinder holder 29. That by which the linear motor 8 is generally marketed is used. What is shown in drawing 5 -6 is equipped with the stator 9 which electromagnet 9a which has a magnetic circuit fixes, and is formed in a cross-section easy form, and the migration child 10 of a cross-section abbreviation pi typeface who prepares coil object 10a in a point, and is constituted, and the migration child 10 is arranged movable in the inside of a stator 9. And a migration gripper can be driven to a longitudinal direction by attaching the stator 9 of this linear motor 8 in wall 1a of a machine frame 1, and attaching the migration child 10 behind the cylinder holder 29.
[0020] In addition, the stator 11 which arranges in one field the substrate 13 arranged on two or more coils 12 and a coil 12 as a linear motor is shown not only in **** but in drawing 7 , While being formed in a cross-section KO typeface so that coil 12 and a substrate 13 may be surrounded, it may be constituted including the migration child 15 by whom the electromagnet 16 of a multi-electrode field is attached so that a substrate 13 may be countered, and the

migration child 15 may be arranged movable in a stator 11 top.
[0021] The bottom jaw 52 which carries out approach isolation to the upper jaw 51 and the upper jaw 51 is arranged, and the fixed gripper 3 is constituted possible [grasping of the work piece W inserted in between the upper jaw 51 and the bottom jaw 52], as shown in drawing 3 . Moreover, the fixed gripper 3 is equipped with the bottom jaw supporter 60 located under the cylinder part 55 located above a work piece W, and the work piece W, and the bottom jaw 52 drives it by the jaw mechanical component 67 located under the bottom jaw supporter 60.
[0022] A cylinder part 55 is attached in the cylinder holder 59, and the cylinder holder 59 is supported by the machine frame 1.
[0023] a cylinder part 55 -- the inside of the cylinder room 56 and the cylinder room 56 -- the upper and lower sides -- it had the piston 57 arranged movable and the upper jaw 51 attached in the lower limit section of a piston 57, and the role for buffering the impact by approach migration of the bottom jaw 52 is played.
[0024] The arm 62 with which the bottom jaw supporter 60 is supported to revolve by the pin 61 rockable in the center section, The bottom jaw 52 which is supported by the arm 62 and arranged in the upper jaw 51 and the location which counters, The rod 63-64 for pressing the inferior surface of tongue of an arm 62 toward the upper part from the both sides of a pin 61, It is energized so that the upper jaw 51 side may be approached in the bottom jaw 52 with coiled spring 65, while ****(ing) and arranging a rod 63 under the bottom jaw 52. While a rod 64 is arranged at the side which receives on both sides of a rod 63 and a pin 61, an arm 62 is pressed in the direction which isolates the bottom jaw 52 from the upper jaw 51 by the jaw mechanical component 67.
[0025] It has cam 17B and the swinging arm section 68, and connects with the servo motor 18 of the cam 17B above-mentioned, and the jaw mechanical component 67 is being fixed to the cam shaft 19 which rotates by the drive of a servo motor 18, as shown in drawing 1 and drawing 4 .
[0026] It has the swinging arm 69 rocked centering on a shaft 47 (the migration gripper 7 side and same axle) as the swinging arm section 68 is shown in drawing 4 , and cam follower 49B which it is contacted by cam 17B and arranged at the end of a swinging arm 69, and a swinging arm 69 is formed so that a tip may incline in a plane view press machine side from the part which fits into a shaft 47, and the other end is connected with the pin 70 which presses the inferior surface of tongue of a rod 64 toward the upper part. And by the drive of a servo motor 18, if cam 17B rotates, when the eccentric section of cam 17B presses cam follower 49B and rotates a swinging arm 68 counterclockwise (the same direction as the swinging arm 48 of drawing 2) centering on a shaft 47, a rod 64 will be raised, an arm 62 will be rotated counterclockwise (refer to drawing 4), and the bottom jaw 52 will be isolated from the upper jaw 51. Moreover, when the eccentric section of cam 17B is passed, a swinging arm 62 is clockwise rotated according to the energization force of coiled spring 65, and the bottom jaw 52 is made to approach to the upper jaw 51.
[0027] Next, an operation of the gripper feed M constituted as mentioned above is explained. When conveying a work piece W to a press machine side and carrying out press working of sheet metal, generally, whenever [crank angle / of a press machine crankshaft] conveys a work piece W in 270 degrees - 90 degrees, and performs press working of sheet metal in 90 degrees - 270 degrees whenever [crank angle]. In the location of 270 degrees, the punch attached in the slide is in an upper location to the female mold attached in the bed side by the press machine side whenever [crank angle]. And since the upper jaws 51 and 21 of the fixed gripper 3 and the migration gripper 7 and the bottom jaws 52 and 22 are grasping the work piece W, the bottom jaws 52 and 22 are in the location which carries out a closest approach to the upper jaws 51 and 21, therefore each driving member operates. When whenever [crank angle] passed over 270 degrees slightly and continued rotation as it was, while the bottom jaw 52 of the fixed gripper 3 was moved in the direction isolated to the upper jaw 51 and the migration gripper 7 had grasped the work piece W to coincidence, a linear motor 8 operates, and a work piece W is conveyed to a press machine side (the direction of drawing 1 Nakamigi). Under the present circumstances, the bottom jaw 52 of the fixed gripper 3 moves through jaw mechanical-component 67 and the bottom jaw supporter 60 to the cam timing of cam 17B by rotating cam shaft 19 and cam 17B by actuation of a servo motor 18.
[0028] Moreover, when the migration child's 10 coil object 10a energizes, in order that a field may occur in coil object 10a and magnet 9a of a stator and the migration child 10 may move actuation of a linear motor 8 to them to a stator 9, the migration child's 10 stroke part work piece W will be conveyed for the migration gripper 7 in which the migration child 10 was attached. In a press machine side, since it is in the location which a punch isolates to female mold, press working of sheet metal is not performed.
[0029] If the crankshaft of a press machine rotates to the location whenever [crank angle / whose] is 90 degrees, it will become the location which carries out a closest approach to a press machine side, and will be moved in the direction in which the bottom jaw 52 of the fixed gripper 3 operates to coincidence by the timing of cam 17B, and approaches it to the upper jaw 51, and the migration gripper 7 will grasp a work piece W. And if it passes over 90 degrees slightly whenever [crank angle] and rotation is continued as it is, in order to move in the direction which the bottom jaw 22 of the migration gripper 7 operates by the cam timing of a cam 17, and isolates to the upper jaw 21, in the migration gripper 7, grasping release of the work piece W is carried out. Under the present circumstances, by rotating cam shaft

19 and a cam 17 by actuation of a servo motor 18, the bottom jaw 22 of the migration gripper 7 makes the press to the upper part of the bottom jaw 22 cancel and moves jaw mechanical-component and the jaw supporter 30 in the direction isolated to the upper jaw 21 according to the energization force of coiled spring 34. By switching the direction of a current to coincidence in a linear motor 8, the direction of the force can change and the migration child 10 can be moved to an anti-press machine side (left in drawing 1) to a stator 9. Therefore, the migration gripper 7 in which the migration child 10 was attached moves to an anti-press machine side, not grasping a work piece W, and a work piece W stops conveyance, while it had been grasped by the fixed gripper 3. And the punch of a press machine will descend and will perform press working of sheet metal. And this actuation will be repeated.

[0030] In addition, since it is making for the feed gear of this invention to carry out both-way migration of the migration gripper by actuation of a linear motor into the summary, a means to make the bottom jaw of each of fixed gripper 3 and the migration gripper 7 drive is not restricted to the above-mentioned gestalt. For example, it can also be made to drive by an air cylinder etc.

[0031] Furthermore, a cam action means may be constituted so that drive transfer may be carried out through a belt pulley at the crankshaft of the press machine instead of a servo motor.

[0032] moreover, the above -- also in which gestalt, although the bottom jaw is arranged in the lower part side of a work piece, it may be arranged above the work piece. In that case, it cannot be overemphasized that an upper jaw has a work piece W caudad.

[0033]

[Effect of the Invention] Since it has the migration gripper which carries out approach isolation to a fixed gripper and said fixed gripper, and a work piece is grasped, it conveys to the press inside of a plane intermittently and both-way migration drives with a linear motor in the direction of said fixed gripper of said migration gripper which carries out approach isolation while the feed gear of a press machine is arranged at a press machine according to this invention, while the feed gear itself is simplified sharply and becoming compact, it is connected to sharp reduction of a manufacturing cost. Furthermore, while the actuation timing like each part to which a work piece is made to transport becomes very easy and can perform stable ****, the timing of each actuation can be set up freely and proper timing doubling as occasion demands becomes possible.

[0034] Moreover, if each Shimo jaw of a fixed gripper and a migration gripper is operated by the servo motor and the cam, since the configuration by the drive connection from a press machine is not needed, it can constitute in a compact further.

[Translation done.]

CLAIMS

[Claim(s)]
[Claim 1] The feed gear of the press machine are the feed gear of the press machine for having the migration gripper which carries out approach isolation to a fixed gripper and said fixed gripper, grasping a work piece, and conveying to the press inside of a plane intermittently while being arranged at a press machine, and both-way migration in the direction of said fixed gripper of said migration gripper which carries out approach isolation carries out driving with a linear motor as the description.
[Claim 2] The feed gear of the press machine according to claim 1 characterized by equipping said linear motor with a stator including a coil object, and the migration child who is arranged movable to said stator and contains an electromagnet, constituting it, fixing said stator to the machine stool of said feed gear, and fixing said migration child to said migration gripper.
[Claim 3] The feed gear of the press machine according to claim 1 characterized by equipping said linear motor with the stator which forms a magnetic circuit including an electromagnet, and the migration child who is arranged movable to said stator and includes a coil object, constituting it, fixing said stator to the machine frame of said feed gear, and fixing said migration child to said migration gripper.
[Claim 4] The feed gear of the press machine according to claim 1, 2, or 3 characterized by connecting with a cam means the movable jaw which grasps the work piece of said migration gripper and said fixed gripper, and said cam means driving with a servo motor.

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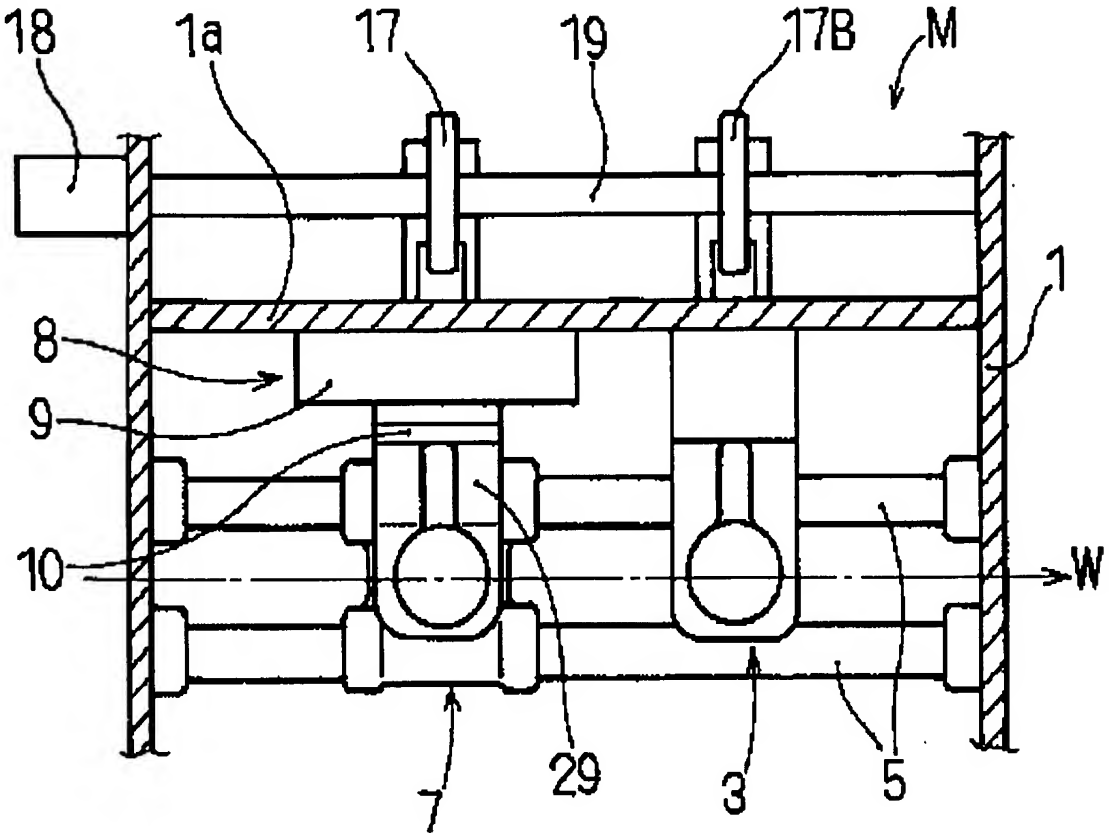
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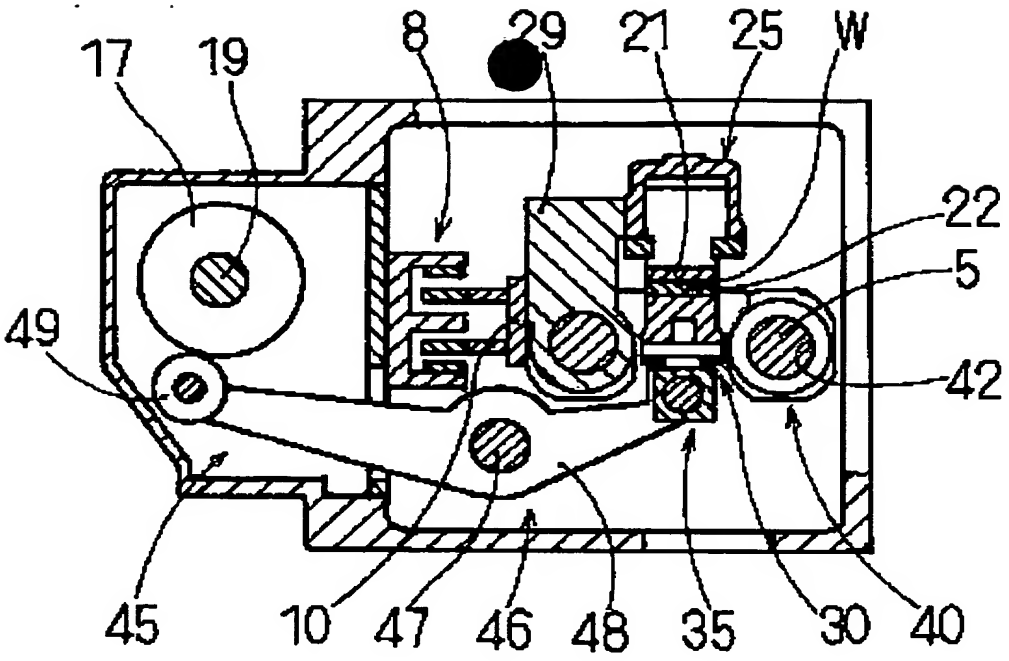
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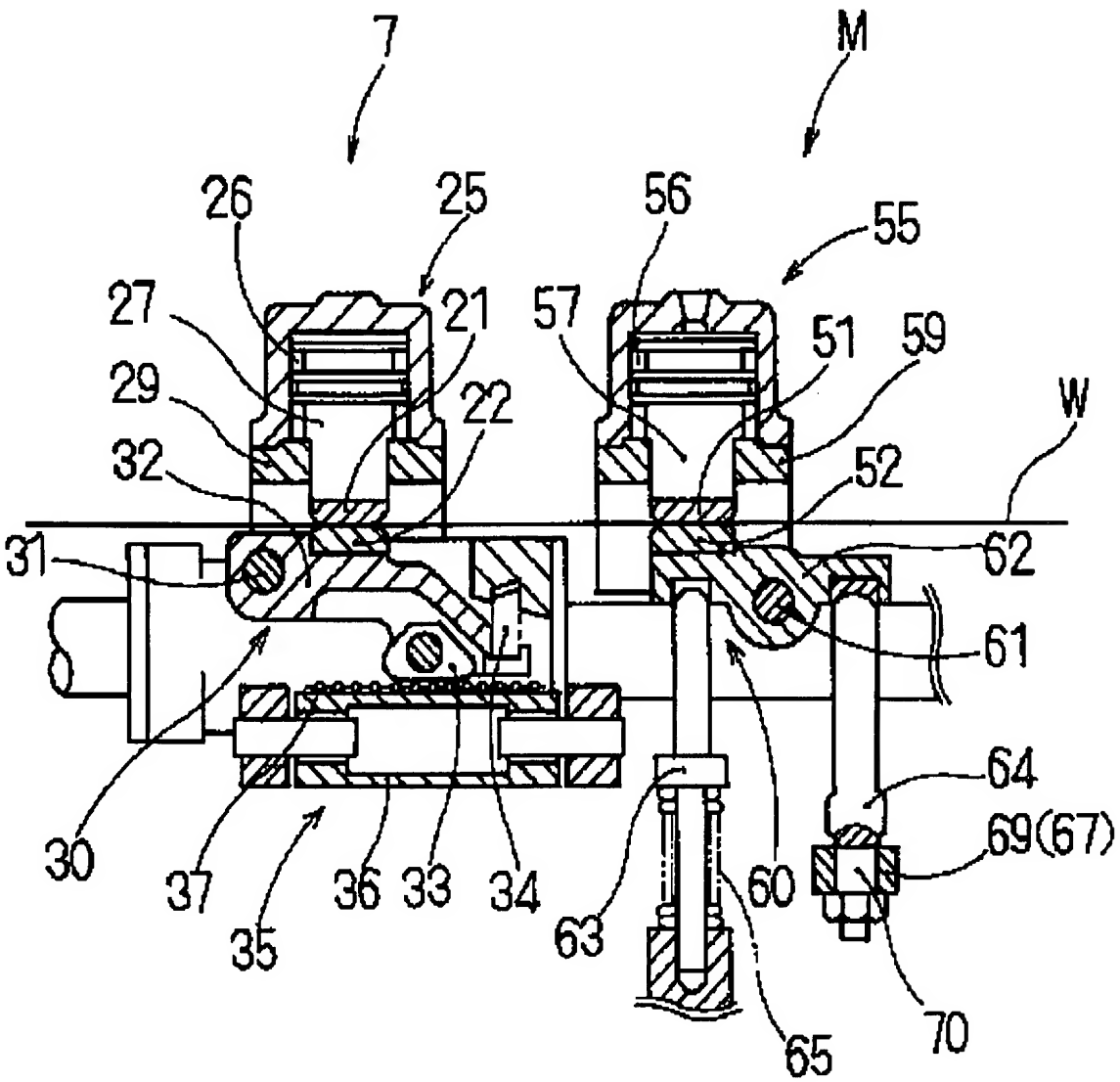
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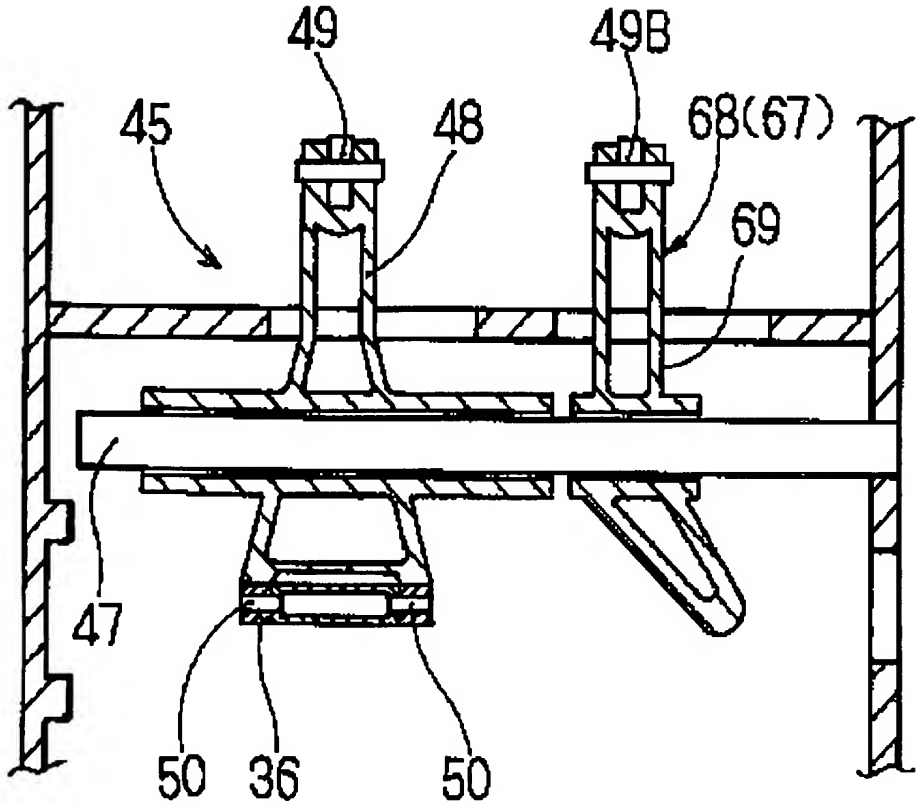
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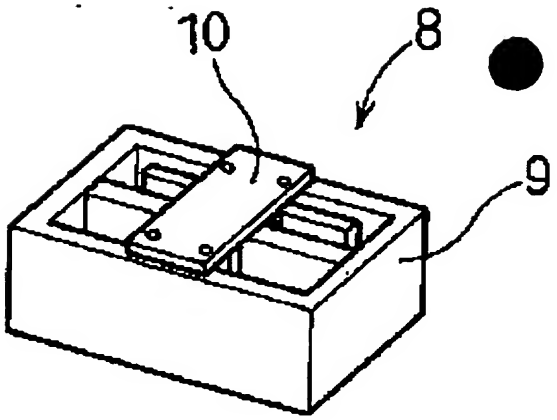
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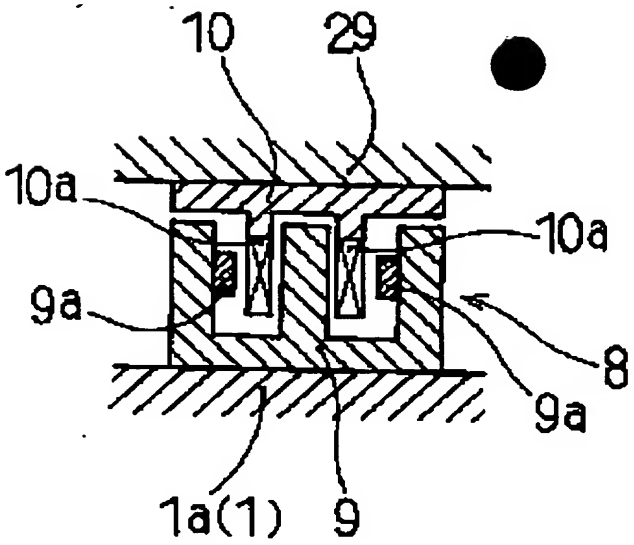
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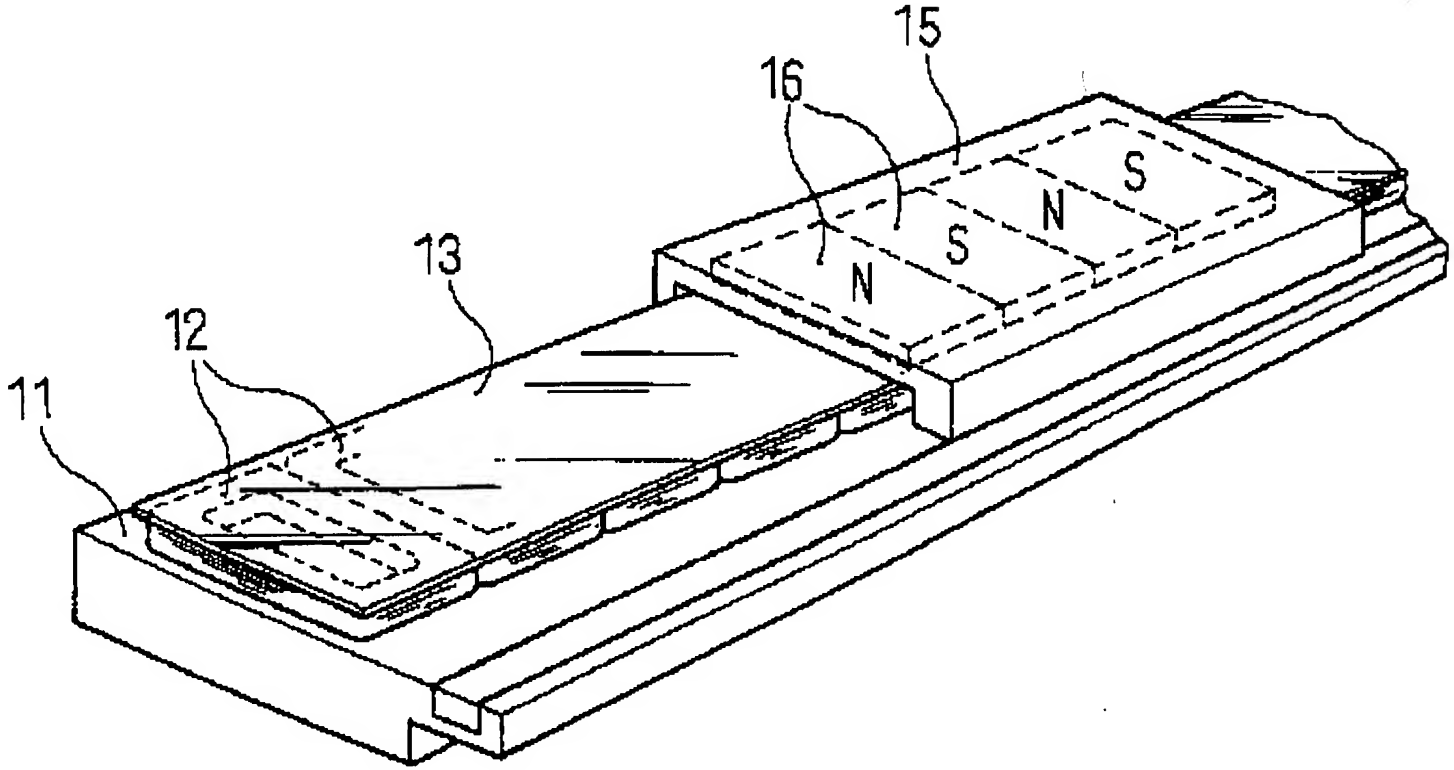
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